

Connecting via Winsock to STN

Welcome to STN International! Enter x:x

LOGINID:SSSPTA1714

PASSWORD:

TERMINAL (ENTER 1, 2, 3, OR ?):2

\* \* \* \* \* Welcome to STN International \* \* \* \* \*

NEWS 1 Web Page URLs for STN Seminar Schedule - N. America  
NEWS 2 "Ask CAS" for self-help around the clock  
NEWS 3 JUL 20 Powerful new interactive analysis and visualization software,  
STN AnaVist, now available  
NEWS 4 AUG 11 STN AnaVist workshops to be held in North America  
NEWS 5 AUG 30 CA/CAPLUS -Increased access to 19th century research documents  
NEWS 6 AUG 30 CASREACT - Enhanced with displayable reaction conditions  
NEWS 7 SEP 09 ACD predicted properties enhanced in REGISTRY/ZREGISTRY  
NEWS 8 OCT 03 MATHDI removed from STN  
NEWS 9 OCT 04 CA/CAPLUS-Canadian Intellectual Property Office (CIPO) added  
to core patent offices  
NEWS 10 OCT 06 STN AnaVist workshops to be held in North America  
NEWS 11 OCT 13 New CAS Information Use Policies Effective October 17, 2005  
NEWS 12 OCT 17 STN(R) AnaVist(TM), Version 1.01, allows the export/download  
of CAPLUS documents for use in third-party analysis and  
visualization tools  
NEWS 13 OCT 27 Free KWIC format extended in full-text databases  
NEWS 14 OCT 27 DIOGENES content streamlined  
NEWS 15 OCT 27 EPFULL enhanced with additional content  
  
NEWS EXPRESS JUNE 13 CURRENT WINDOWS VERSION IS V8.0, CURRENT  
MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP),  
AND CURRENT DISCOVER FILE IS DATED 13 JUNE 2005  
  
NEWS HOURS STN Operating Hours Plus Help Desk Availability  
NEWS INTER General Internet Information  
NEWS LOGIN Welcome Banner and News Items  
NEWS PHONE Direct Dial and Telecommunication Network Access to STN  
NEWS WWW CAS World Wide Web Site (general information)

Enter NEWS followed by the item number or name to see news on that  
specific topic.

All use of STN is subject to the provisions of the STN Customer  
agreement. Please note that this agreement limits use to scientific  
research. Use for software development or design or implementation  
of commercial gateways or other similar uses is prohibited and may  
result in loss of user privileges and other penalties.

\* \* \* \* \* STN Columbus \* \* \* \* \*

FILE 'HOME' ENTERED AT 08:50:42 ON 08 NOV 2005

=> FIL CAPLUS

COST IN U.S. DOLLARS

SINCE FILE

ENTRY

TOTAL

SESSION

FULL ESTIMATED COST

0.42

0.42

FILE 'CAPLUS' ENTERED AT 08:51:43 ON 08 NOV 2005

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2005 AMERICAN CHEMICAL SOCIETY (ACS)

Copyright of the articles to which records in this database refer is held by the publishers listed in the PUBLISHER (PB) field (available for records published or updated in Chemical Abstracts after December 26, 1996), unless otherwise indicated in the original publications. The CA Lexicon is the copyrighted intellectual property of the American Chemical Society and is provided to assist you in searching databases on STN. Any dissemination, distribution, copying, or storing of this information, without the prior written consent of CAS, is strictly prohibited.

FILE COVERS 1907 - 8 Nov 2005 VOL 143 ISS 20  
FILE LAST UPDATED: 7 Nov 2005 (20051107/ED)

Effective October 17, 2005, revised CAS Information Use Policies apply. They are available for your review at:

<http://www.cas.org/infopolicy.html>

=> solid (a) state (a) shear (a) pulverization

986955 SOLID  
277787 SOLIDS  
1192182 SOLID  
(SOLID OR SOLIDS)  
1272978 STATE  
495479 STATES  
1566757 STATE  
(STATE OR STATES)  
135319 SHEAR  
1099 SHEARS  
135976 SHEAR  
(SHEAR OR SHEARS)  
7539 PULVERIZATION  
22 PULVERIZATIONS  
7553 PULVERIZATION  
(PULVERIZATION OR PULVERIZATIONS)  
L1 52 SOLID (A) STATE (A) SHEAR (A) PULVERIZATION

=> solid state shear pulverization

986955 SOLID  
277787 SOLIDS  
1192182 SOLID  
(SOLID OR SOLIDS)  
1272978 STATE  
495479 STATES  
1566757 STATE  
(STATE OR STATES)  
135319 SHEAR  
1099 SHEARS  
135976 SHEAR  
(SHEAR OR SHEARS)  
7539 PULVERIZATION  
22 PULVERIZATIONS  
7553 PULVERIZATION  
(PULVERIZATION OR PULVERIZATIONS)  
L2 49 SOLID STATE SHEAR PULVERIZATION  
(SOLID(W) STATE(W) SHEAR(W) PULVERIZATION)

=> l2 and exfoliat?

11722 EXFOLIAT?

L3 8 L2 AND EXFOLIAT?

=> d abs ibib 1-8

L3 ANSWER 1 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB The production of polymer nanocomposites with excellent dispersion of nanofillers has proven to be a major challenge using conventional polymer

processing methods. As a result of commonly poor dispersion of nanofillers, the promise of enhanced properties in nanocomposites has often gone unrealized. We have recently demonstrated that a process called **solid-state shear pulverization** (SSSP) can yield well-exfoliated polymer-clay nanocomposites and well-dispersed polymer-multiwall carbon nanotube and polymer-alumina nanoparticle composites. Furthermore, the **exfoliation** of dispersion achieved via SSSP is stable during subsequent melt processing of the nanocomposites made via SSSP. The connection between synergistic macroscopic properties, from modulus to thermal stability to conductivity, and dispersion of nanofiller is illustrated by the results obtained in this study.

ACCESSION NUMBER: 2005:688200 CAPLUS  
TITLE: Polymer nanocomposites by pulverization: enhanced properties and dispersion  
AUTHOR(S): Kasimatis, Kosmas G.; Nowell, Joseph A.; Dykes, Laura M.; Burghardt, Wesley R.; Ramanathan, Thillaiyan; Brinson, L. Catherine; Torkelson, John M.  
CORPORATE SOURCE: Northwestern University, Evanston, IL, 60208-3120, USA  
SOURCE: Annual Technical Conference - Society of Plastics Engineers (2005), 63rd, 1965-1969  
CODEN: ACPED4; ISSN: 0272-5223  
PUBLISHER: Society of Plastics Engineers  
DOCUMENT TYPE: Journal; (computer optical disk)  
LANGUAGE: English  
REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 2 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB A polymer-clay nanocomposite is made by providing a supply of polymer-clay mixture, **exfoliating** the mixture through **solid-state shear pulverization** in the presence of cooling sufficient to maintain the extruded mixture in the solid state during the pulverization, and discharging the resulting **exfoliated** mixture

ACCESSION NUMBER: 2005:394857 CAPLUS  
DOCUMENT NUMBER: 142:431257  
TITLE: **Exfoliated** polymer-clay nanocomposite and its manufacture  
INVENTOR(S): Torkelson, John Mark; Lebovitz, Andrew; Kasimatis, Kosmas; Khait, Klementina  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE     |
|------------------------|------|----------|-----------------|----------|
| US 2005096422          | A1   | 20050505 | US 2003-701067  | 20031105 |
| PRIORITY APPLN. INFO.: |      |          | US 2003-701067  | 20031105 |

L3 ANSWER 3 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB Well-exfoliated 95 wt%/5 wt% polypropylene-clay nanocomposites were prepared using a novel process called **solid-state shear pulverization** (SSSP). The SSSP method is a continuous process that employs a modified twin-screw extruder that exposes the polymeric system to high shear and compressive forces in the solid state, yielding high levels of dispersion. **Exfoliation** levels was compared by transmission electron microscopy, x-ray diffraction, and crystallization half-times to those achieved via melt extrusion, showing that SSSP yields much better dispersion. The dispersion achieved by SSSP was kinetically stable when the samples were annealed in the melt state over several hours. This indicates that the SSSP-processed nanocomposites can be further processed in the melt without concern for loss of **exfoliation**.

ACCESSION NUMBER: 2004:669997 CAPLUS  
DOCUMENT NUMBER: 142:7221  
TITLE: Well-**exfoliated**, kinetically stable  
polypropylene-clay nanocomposites made by  
**solid-state shear  
pulverization**  
AUTHOR(S): Kasimatis, Kosmas G.; Torkelson, John M.  
CORPORATE SOURCE: Dept. of Chemical and Biological Engineering and Dep.  
of Materials Science and Engineering, Northwestern  
University, Evanston, IL, 60208-3120, USA  
SOURCE: PMSE Preprints (2004), 91, 173-174  
CODEN: PPMRA9; ISSN: 1550-6703  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal; (computer optical disk)  
LANGUAGE: English  
REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 4 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB The production of well-**exfoliated** polyolefin-clay nanocomposites has  
been largely unsuccessful using conventional processes such as twin-screw  
extrusion. This is because organoclay does not disperse well in non-polar  
polymers during melt processing. Well-**exfoliated** 95wt%/5wt%  
polypropylene-clay nanocomposites were prepared using a novel process called  
**solid-state shear pulverization**  
(SSSP). The SSSP method is a continuous process that employs a modified  
twin-screw extruder that exposes the polymeric system to high shear and  
compressive forces in the solid state, yielding high levels of dispersion.  
**Exfoliation** levels was compared by transmission electron  
microscopy, x-ray diffraction, and crystallization half-times to those achieved  
via melt extrusion, showing that SSSP yields much better dispersion. The  
dispersion achieved by SSSP was found to be kinetically stable when the  
samples were annealed in the melt state over several hours. This  
indicates that the SSSP-processed nanocomposites can be further processed  
in the melt without concern for loss of **exfoliation**.

ACCESSION NUMBER: 2004:659978 CAPLUS  
TITLE: Well-**exfoliated**, kinetically stable  
polypropylene-clay nanocomposites made by  
**solid-state shear  
pulverization**  
AUTHOR(S): Kasimatis, Kosmas G.; Torkelson, John M.  
CORPORATE SOURCE: Chemical and Biological Engineering, Northwestern  
University, Evanston, IL, 60208, USA  
SOURCE: Abstracts of Papers, 228th ACS National Meeting,  
Philadelphia, PA, United States, August 22-26, 2004  
(2004), PMSE-096. American Chemical Society:  
Washington, D. C.  
CODEN: 69FTZ8  
DOCUMENT TYPE: Conference; Meeting Abstract  
LANGUAGE: English

L3 ANSWER 5 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB Anal. by electron microscopy, x-ray diffraction/scattering and DSC reveals  
that well-**exfoliated** states can be achieved in polypropylene  
(PP)/clay nanocomposites using **solid-state  
shear pulverization**. These **exfoliated** states  
cannot be achieved in PP/clay nanocomposites by melt processing. The  
nanocomposites remain well-**exfoliated** even after 1.5-2 h of  
annealing in the melt state. Thus, even if an **exfoliated** state  
is not thermodynamically favored, it is kinetically stable over long times  
in the melt state.

ACCESSION NUMBER: 2004:488331 CAPLUS  
DOCUMENT NUMBER: 142:198884  
TITLE: Kinetic stability of the well-**exfoliated**  
state in polypropylene-clay nanocomposites made by  
**solid-state shear  
pulverization**  
AUTHOR(S): Kasimatis, Kosmas G.; Torkelson, John M.

CORPORATE SOURCE: Department of Chemical and Biological Engineering,  
Department of Materials Science and Engineering,  
Northwestern University, Evanston, IL, 60208-3120, USA  
SOURCE: Annual Technical Conference - Society of Plastics  
Engineers (2004), 62nd (Vol. 2), 1503-1507  
CODEN: ACPED4; ISSN: 0272-5223  
PUBLISHER: Society of Plastics Engineers  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 6 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB Producing a polymer-clay nanocomposite comprises providing a supply of  
melt-extruded polymer-clay mixture, **exfoliating** the mixture through  
**solid-state shear pulverization** in  
the presence of cooling sufficient to maintain the extruded mixture in the  
solid state during the pulverization, and discharging the resulting  
**exfoliated** mixture Producing a polymer hybrid nanocomposite  
comprises dispersing a clay component or other reinforcing material  
throughout a polymer matrix by **solid-state**  
**shear pulverization** of a polymer mixed with the clay  
component. The initial melt-extrusion step thoroughly mixes the  
polymer-clay mixture, yielding an intimate contact of polymer and clay; and  
after the mixture is thoroughly mixed (but not yet **exfoliated**),  
**solid-state shear pulverization**  
yields a high level of **exfoliation** and dispersion and improved  
nanocomposite properties.

ACCESSION NUMBER: 2004:428849 CAPLUS

DOCUMENT NUMBER: 141:8200

TITLE: Producing **exfoliated** polymer-clay  
nanocomposite and polymer-clay nanocomposite product  
INVENTOR(S): Torkelson, John M.; Lebovitz, Andrew H.; Kasimatis,  
Kosmas; Khait, Klementina

PATENT ASSIGNEE(S): Material Sciences Corporation, USA

SOURCE: PCT Int. Appl., 20 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE     |
|---------------|------|----------|-----------------|----------|
| WO 2004043663 | A2   | 20040527 | WO 2003-US34892 | 20031105 |
| WO 2004043663 | A3   | 20040812 |                 |          |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,  
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ,  
OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,  
KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,  
FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,  
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2002-423591P P 20021105

L3 ANSWER 7 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB **Solid-state shear pulverization**  
(SSSP) was compared in terms of dispersed-phase sizes with melt processing  
methods in producing blends of polystyrene with other polymers (e.g. PE)  
as well as nanocomposites of polypropylene and organoclays. To elucidate  
the mechanism of SSSP, fluorescence-detector GPC was used to detect  
interpolymer radical coupling in several polymer blends, thought to  
originate from chain scission during blend pulverization.

ACCESSION NUMBER: 2003:222564 CAPLUS

DOCUMENT NUMBER: 138:322021

Corresponding  
WO

TITLE: Innovative process for compatibilizing polymer blends  
and producing well-**exfoliated** polymer  
nanocomposites: **Solid-state**  
**shear pulverization**  
AUTHOR(S): Lebovitz, Andrew H.; Kasimatis, Kosmas; Torkelson,  
John M.  
CORPORATE SOURCE: Dept. of Chemical Engineering, Northwestern  
University, Evanston, IL, 60208-3120, USA  
SOURCE: PMSE Preprints (2003), 88, 96-97  
CODEN: PPMRA9; ISSN: 1550-6703  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal; (computer optical disk)  
LANGUAGE: English  
REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 8 OF 8 CAPLUS COPYRIGHT 2005 ACS on STN

AB A novel, continuous, mech. process called **solid-state**  
**shear pulverization** (SSSP) is capable of overcoming  
long-standing problems associated with melt-state processing of polymer  
blends and nanocomposites. In comparison to melt-state processing, SSSP  
is capable of producing finer dispersions of a minor-phase polymer in a  
matrix polymer. Examples will be given both where melt-processing yields  
large average dispersed-phase particle diameters,  $D_n$ , (an 85/15 polystyrene  
(PS)-polyethylene (PE) wax blend yields  $D_n=17.5\ \mu$  by melt processing  
but  $D_n=0.7\ \mu$  by SSSP) and where it yields small  $D_n$  (a 90/10 PS/high d.  
PE blend yields  $D_n=500\ \text{nm}$  by melt processing and  $270\ \text{nm}$  by SSSP). SSSP  
also yields compatibilization of immiscible blends such as PS/PE and  
PS/polymethylmethacrylate, as proven by stability of  $D_n$  to static,  
high-temperature annealing. In contrast, melt-processed blends coarsen under  
the same annealing conditions. The mol. origin of compatibilization via  
SSSP is the in situ production of block copolymer resulting from interpolymer  
radical coupling of macroradicals formed by modest chain scission  
accompanying SSSP. Finally, well-**exfoliated** polypropylene-clay  
nanocomposites have been made via SSSP as evidenced by x-ray scattering,  
transmission electron microscopy, and differential scanning calorimetry.

ACCESSION NUMBER: 2003:185855 CAPLUS

TITLE: Innovative process for compatibilizing polymer blends  
and producing well-**exfoliated** polymer  
nanocomposites: **Solid-state**  
**shear pulverization**  
AUTHOR(S): Lebovitz, Andrew H.; Kasimatis, Kosmas; Torkelson,  
John M.  
CORPORATE SOURCE: Chemical Engineering, Northwestern University,  
Evanston, IL, 60208, USA  
SOURCE: Abstracts of Papers, 225th ACS National Meeting, New  
Orleans, LA, United States, March 23-27, 2003 (2003),  
PMSE-057. American Chemical Society: Washington, D.  
C.  
CODEN: 69DSA4  
DOCUMENT TYPE: Conference; Meeting Abstract  
LANGUAGE: English